

WHAT IS CLAIMED IS:

1 1. A system for synchronizing a public switched telephone network
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising:
3 a PSTN interface coupled to transmit and receive voiceband samples;
4 a data DSL transceiver coupled to modulate and demodulate data to and from
5 DSL samples;
6 a synchronization circuit coupled to synchronize said voiceband samples and
7 said DSL samples; and
8 a converter circuit coupled to convert the synchronized voiceband samples and
9 the synchronized DSL samples between analog and digital formats.

1 2. The system of claim 1, wherein said converter circuit converts said
2 voiceband samples and said DSL samples from a digital format to an analog format for
3 transmitting a combined voiceband and data signal.

1 3. The system of claim 1, wherein said converter circuit converts said
2 voiceband samples and said DSL samples from an analog format to a digital format for
3 receiving a combined voiceband and data signal.

1 4. The system of claim 1, wherein said synchronization circuit
2 synchronizes said voiceband samples with said DSL samples and comprises:
3 a second converter circuit coupled to convert said voiceband samples from a
4 companded format to a linear format;
5 an upsampler circuit coupled to increase a frequency of said voiceband
6 samples from $(8 + \delta)$ kHz to $(8 + \delta) \cdot M$ kHz; and
7 a re-timer circuit coupled to synchronize the upsampled voiceband samples
8 with said DSL samples.

1 5. The system of claim 1, wherein said synchronization circuit
2 synchronizes said voiceband samples with said PSTN clock and comprises:
3 a re-timer circuit coupled to synchronize upsampled voiceband samples with
4 said PSTN clock;
5 a downsampler circuit coupled to reduce a frequency of said upsampled
6 voiceband samples from $(8 + \delta) \cdot M$ kHz to $(8 + \delta)$ kHz; and

7 a second converter circuit coupled to convert the downsampled voiceband
8 samples from a linear format to a companded format.

1 6. The system of claim 1, wherein said synchronization circuit
2 synchronizes said voiceband samples with said DSL samples and comprises:
3 a phase offset detection circuit coupled to detect a phase difference between
4 said PSTN clock and said DSL clock;
5 a phase interpolation circuit coupled to adjust said voiceband samples
6 according to the detected phase difference; and
7 a multiplexer circuit coupled to multiplex said DSL samples with the adjusted
8 voiceband samples for transmission.

1 7. The system of claim 1, wherein said synchronization circuit
2 synchronizes said voiceband samples with said DSL samples and comprises:
3 a phase offset detection circuit coupled to detect a phase difference between
4 said PSTN clock and said DSL clock;
5 a demultiplexer circuit coupled to demultiplex said voiceband samples and
6 said DSL samples from a received signal; and
7 a phase interpolation circuit coupled to adjust said voiceband samples
8 according to the detected phase difference.

1 8. A method of synchronizing a public switched telephone network
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising the acts of:
3 upsampling a voiceband signal, to increase said voiceband signal to a
4 frequency comparable with a data signal; and
5 sample slipping one of said voiceband signal and said data signal, to
6 synchronize said voiceband signal and said data signal.

1 9. The method of claim 8, wherein said act of sample slipping
2 synchronizes said voiceband signal with said data signal.

1 10. A method of synchronizing a public switched telephone network
2 (PSTN) clock and a digital subscriber line (DSL) clock, comprising the acts of:
3 determining a phase offset between a voiceband signal and a data signal; and
4 shifting one of said voiceband signal and said data signal according to said
5 phase offset, to synchronize said voiceband signal and said data signal.